

ON SOME CHARACTERIZATION OF AN INTUITIONISTIC FUZZY STRUCTURE RINGS

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ABSTRACT

In this paper, the concepts of an intuitionistic fuzzy structure space and intuitionistic fuzzy structure ring are introduced. Also, the concepts of an intuitionistic fuzzy point open structure, intuitionistic fuzzy point open structure* and intuitionistic fuzzy compact open structure are introduced and some interesting properties are established.

KEYWORDS: Intuitionistic Fuzzy Structure Space, Intuitionistic Fuzzy Structure Neighbourhood, Intuitionistic Fuzzy Structure Continuous Function, Intuitionistic Fuzzy Structure Ring, Fundamental System of an Intuitionistic Fuzzy Structure Neighbourhoods, Intuitionistic Fuzzy Point Open Structure, Intuitionistic Fuzzy Point Open Structure* and Intuitionistic Fuzzy Compact Open Structure

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INTRODUCTION

The concept of fuzzy sets was introduced by Zadeh[6] and later Atanassov[1] generalized the concept to intuitionistic fuzzy sets. On the otherhand, Coker[2] introduced the notions of an intuitionistic fuzzy topological spaces, intuitionistic fuzzy continuity and some other related concepts. The concept of an intuitionistic fuzzy G_δ - α -locally closed set was introduced by R.Narmada Devi, E.Roja and M.K.Uma[5]. A.Dey Ray[4] was the first introduced and discussion the concepts of fuzzy topological ring. In this paper, the concepts of an intuitionistic fuzzy structure space, intuitionistic fuzzy structure continuous function and intuitionistic fuzzy structure ring are introduced and studied. Some interesting properties are discussed.

PRELIMINARIES

Definintion 2.1[1] Let X be a nonempty fixed set and I be the closed interval $[0,1]$. An intuitionistic fuzzy set(IFS) A is an object of the following form $A = \{\langle x, \mu_A(x), \gamma_A(x) \rangle : x \in X\}$, where the mappings $\mu_A : X \rightarrow I$ and $\gamma_A : X \rightarrow I$ denote the degree of membership (namely $\mu_A(x)$) and the degree of nonmembership (namely $\gamma_A(x)$) for each element $x \in X$ to the set A , respectively, and $0 \leq \mu_A(x) + \gamma_A(x) \leq 1$ for each $x \in X$. Obviously, every fuzzy set A on a nonempty set X is an IFS of the following form, $A = \{\langle x, \mu_A(x), 1 - \mu_A(x) \rangle : x \in X\}$. For the sake of simplicity, we shall use the symbol $A = \langle x, \mu_A, \gamma_A \rangle$ for the intuitionistic fuzzy set $A = \{\langle x, \mu_A(x), \gamma_A(x) \rangle : x \in X\}$.

Definintion 2.2[2] An intuitionistic fuzzy topology (IFT) in Coker's sense on a nonempty set X is a family τ of IFSs in X satisfying the following axioms:

- (i) $0_\sim, 1_\sim \in \tau$;
- (ii) $G_1 \cap G_2 \in \tau$ for any $G_1, G_2 \in \tau$;

(iii) $\cup G_i \in \tau$ for arbitrary family $\{G_i \mid i \in I\} \subseteq \tau$.

In this case the ordered pair (X, τ) is called an intuitionistic fuzzy topological space (*IFTS*) on X and each *IFS* in τ is called an intuitionistic fuzzy open set (*IFOS*). The complement $\bar{A}$ of an *IFOS* A in X is called an intuitionistic fuzzy closed set (*IFCS*) in X .

Definition 2. 3[2] Let (X, τ) and (Y, ϕ) be two IFTSs and let $f : X \rightarrow Y$ be a function. Then f is said to be intuitionistic fuzzy continuous iff the preimage of each IFS in ϕ is an IFS in τ .

Definition 2.4[5] Let (X, T) be an intuitionistic fuzzy topological space. Let $A = \langle x, \mu_A, \gamma_A \rangle$ be an intuitionistic fuzzy set on an intuitionistic fuzzy topological space (X, T) . Then A is said to be an intuitionistic fuzzy G_δ - α -locally closed set (in short, IF G_δ - α -lcs) if $A = B \cap C$, where B is an intuitionistic fuzzy G_δ set and C is an intuitionistic fuzzy α -closed set. The complement of an intuitionistic fuzzy G_δ -locally closed set is said to be an intuitionistic fuzzy G_δ - α -locally open set (in short, IF G_δ - α -los).

INTUITIONISTIC FUZZY STRUCTURE RINGS

Definition 3.1 Let (X, T) be any intuitionistic fuzzy topological space. A family S of an intuitionistic fuzzy G_δ - α -locally open sets on (X, T) is said to be intuitionistic fuzzy structure on X if it satisfies the following axioms:

- (i) $0_\sim, 1_\sim \in S$;
- (ii) $G_1 \cap G_2 \in S$, for any $G_1, G_2 \in S$;
- (iii) $\cup G_i \in S$, for arbitrary family $\{G_i \mid i \in I\} \subseteq S$.

Then the ordered pair (X, S) is said to be an intuitionistic fuzzy structure space. Every member of S is said to be an intuitionistic fuzzy structure open set (IFSOS) in X . The complement $\bar{A}$ of an IFSOS A in X is an intuitionistic fuzzy structure closed set (IFSCS) in X .

Definition 3.2 Let (X, S_1) be any intuitionistic fuzzy structure space. Then S is said to be an intuitionistic fuzzy structure on the intuitionistic fuzzy product structure space $(X \times X, S)$ if it is generated by the collection $\{U \times V \mid U, V \in S_1\}$ where

$$\mu_{(U \times V)}(s, t) = \begin{cases} \mu_U(t), & \text{if } \mu_V(s) > 0 \\ 0, & \text{if otherwise} \end{cases} \quad \text{and} \quad \gamma_{(U \times V)}(s, t) = \begin{cases} \gamma_V(t), & \text{if } \gamma_U(s) \leq 1 \\ 0, & \text{if otherwise} \end{cases}$$

Definition 3.3 Let (X, S) be any intuitionistic fuzzy structure space. Let $A = \langle x, \mu_A, \gamma_A \rangle$ be an intuitionistic fuzzy set in X . Then A is said to be an

(i) intuitionistic fuzzy structure neighbourhood of an intuitionistic fuzzy point $x_{r,s}$ [3] in X if and only if there exists an intuitionistic fuzzy structure open set B in X such that $x_{r,s} \in B \subseteq A$.

(ii) intuitionistic fuzzy structure q -neighbourhood of an intuitionistic fuzzy point $x_{r,s}$ in X if and only if there

exists an intuitionistic fuzzy structure open set B in X such that $x_{r,s}qB$ and $B \subseteq A$.

Note 3.1 Let (X, S) be any intuitionistic fuzzy structure space. If A is an intuitionistic fuzzy structure neighbourhood (resp. q -neighbourhood) of an intuitionistic fuzzy point $x_{r,s}$ in X and A is intuitionistic fuzzy structure open (resp. closed) set, then we say A is an intuitionistic fuzzy structure open (resp. closed) neighbourhood (resp. q -neighbourhood) of an intuitionistic fuzzy point $x_{r,s}$ in X .

Definition 3.4 Let (X, S_1) and (Y, S_2) be any two intuitionistic fuzzy structure spaces. Let

$f : (X, S_1) \rightarrow (Y, S_2)$ be any function. Then

(i) f is said to be an intuitionistic fuzzy structure continuous function if and only if for each intuitionistic fuzzy point $x_{r,s}$ in X and each intuitionistic fuzzy structure neighbourhood B of an intuitionistic fuzzy point $f(x_{r,s})$ in Y , there exists intuitionistic fuzzy structure neighbourhood A of an intuitionistic fuzzy point $x_{r,s}$ in X such that $f(A) \subseteq B$.

(ii) f is said to be an intuitionistic fuzzy structure homeomorphism if f is bijective, intuitionistic fuzzy structure continuous function and f^{-1} is an intuitionistic fuzzy structure continuous function.

Definition 3.5 Let R be a ring and S be any intuitionistic fuzzy structure on R such that, for all $x, y \in R$,

(i) $(x, y) \rightarrow x + y$ is an intuitionistic fuzzy structure continuous function,

(ii) $(x, y) \rightarrow x \cdot y$ is an intuitionistic fuzzy structure continuous function,

(iii) $x \rightarrow -x$ is an intuitionistic fuzzy structure continuous function.

Then the pair (R, S) is said to be an intuitionistic fuzzy structure ring.

Definition 3.6 Let R be a ring. Let A and B be any two intuitionistic fuzzy sets on R . Then for $x, y, t \in R$, we define three types of an intuitionistic fuzzy sets as follows:

(i) $A + B = \langle x, \mu_{A+B}, \gamma_{A+B} \rangle$ where $\mu_{A+B}(x) = \sup\{\mu_B(x-y) : \mu_A(y) > 0\}$ and

$\gamma_{A+B}(x) = \inf\{\gamma_B(x-y) : \gamma_A(y) \leq 1\}$ with $\mu_{A+B}(x) + \gamma_{A+B}(x) \leq 1$.

(ii) $AB = \langle x, \mu_{AB}, \gamma_{AB} \rangle$ where $\mu_{AB} = \begin{cases} \sup\{\mu_B(t) : x = ty \text{ and } \mu_A(y) > 0\}, & \text{if } \{(y, t) \in R \times R : yt = x\} \neq \emptyset \\ 0, & \text{if otherwise} \end{cases}$

and $\gamma_{AB} = \begin{cases} \inf\{\gamma_B(t) : x = ty \text{ and } \gamma_A(y) \leq 1\}, & \text{if } \{(y, t) \in R \times R : yt = x\} \neq \emptyset \\ 1, & \text{if otherwise} \end{cases}$ with $\mu_{AB}(x) + \gamma_{AB}(x) \leq 1$.

(iii) $-A = \langle x, \mu_{-A}, \gamma_{-A} \rangle$ where $\mu_{-A}(x) = \mu_A(-x)$ and $\gamma_{-A}(x) = \gamma_A(-x)$ with $\mu_{-A}(x) + \gamma_{-A}(x) \leq 1$.

Note 3.2 For any three intuitionistic fuzzy sets A, B and C on R , (i) $A + B + C = (A + B) + C$ (ii) In general, $A + B \neq B + A$ and $A \cdot B \neq B \cdot A$.

Remark 3.1 If for any two intuitionistic fuzzy points $x_{r,s}$ and $y_{r,s}$ on R , then the following hold:

- (i) $x_{r,s} + y_{r,s} = (x + y)_{r,s}$,
- (ii) $x_{r,s} \cdot y_{r,s} = (x \cdot y)_{r,s}$,
- (iii) $-x_{r,s} = (-x)_{r,s}$ and
- (iv) $(-x)_{r,s} + x_{r,s} = 0_{r,s} = x_{r,s} + (-x)_{r,s}$

Remark 3.2 Let (R, S) be any intuitionistic fuzzy structure ring. If for any intuitionistic fuzzy sets A_1, A_2, B_1 and B_2 on R with $A_1 \subseteq A_2$ and $B_1 \subseteq B_2$ and for all $x \in R$, $r, s \in [0, 1]$,

- (i) $A_1 + B_1 \subseteq A_2 + B_2$,
- (ii) $A_1 \cdot B_1 \subseteq A_2 \cdot B_2$,
- (iii) $x_{r,s} \cdot A_1 \subseteq x_{r,s} \cdot B_1$ and
- (iv) $A_1 \cdot x_{r,s} \subseteq B_1 \cdot x_{r,s}$.

Definition 3.7 Let (R, S) be any intuitionistic fuzzy structure ring. For each intuitionistic fuzzy set A , each $x \in R$ and $r, s \in [0, 1]$ with $r + s \leq 1$, we define two types of an intuitionistic fuzzy sets as follows:

- (i) $x_{r,s}A = \langle x, \mu_{x_{r,s}A}, \gamma_{x_{r,s}A} \rangle$
 where $\mu_{x_{r,s}A}(z) = \begin{cases} \sup\{\mu_A(t) : z = xt\}, & \text{if there is } t, \text{ such that } z = xt \\ 0, & \text{if otherwise} \end{cases}$
 and $\gamma_{x_{r,s}A}(z) = \begin{cases} \inf\{\gamma_A(t) : z = xt\}, & \text{if there is } t, \text{ such that } z = xt \\ 0, & \text{if otherwise} \end{cases}$ with $\mu_{x_{r,s}A}(z) + \gamma_{x_{r,s}A}(z) \leq 1$.
- (ii) $Ax_{r,s} = \langle x, \mu_{Ax_{r,s}}, \gamma_{Ax_{r,s}} \rangle$ where $\mu_{Ax_{r,s}}(z) = \begin{cases} r, & \text{if there is } s, \text{ such that } sx = z \\ 0, & \text{if otherwise} \end{cases}$
 and $\gamma_{Ax_{r,s}}(z) = \begin{cases} s, & \text{if there is } s, \text{ such that } sx = z \\ 0, & \text{if otherwise} \end{cases}$ with $\mu_{Ax_{r,s}}(z) + \gamma_{Ax_{r,s}}(z) \leq 1$.

Proposition 3.1 Let (R, S) be any intuitionistic fuzzy structure ring. Let A be any intuitionistic fuzzy set on R .

- (i) If $\phi : R \rightarrow R$ is given by $\phi(x) = -x$, then ϕ is an intuitionistic fuzzy structure homeomorphism.
- (ii) A is an intuitionistic fuzzy structure open set if and only if $-A$ is an intuitionistic fuzzy structure open set.
- (iii) A is an intuitionistic fuzzy structure neighbourhood of an intuitionistic fuzzy point $0_{r,s}$ if and only if $-A$ is an intuitionistic fuzzy structure neighbourhood of an intuitionistic fuzzy point $0_{r,s}$.
- (iv) A is an intuitionistic fuzzy structure q -neighbourhood of an intuitionistic fuzzy point $0_{r,s}$ if and only

if $-A$ is an intuitionistic fuzzy structure q -neighbourhood of an intuitionistic fuzzy point $0_{r,s}$.

(v) If $\phi: R \rightarrow R$ is given by $\phi_a(x) = a + x$, for each $a \in R$, then ϕ_a is an intuitionistic fuzzy structure homeomorphism.

Proposition 3.2 In an intuitionistic fuzzy structure ring (R, S) , for $x \in R$ and $r, s \in [0, 1]$ with $r + s \leq 1$,

(i) A is an intuitionistic fuzzy structure open set if and only if $x_{r,s} + A$ is an intuitionistic fuzzy structure open set.

(ii) A is an intuitionistic fuzzy structure closed set if and only if $x_{r,s} + A$ is an intuitionistic fuzzy structure closed set.

(iii) If A is an intuitionistic fuzzy structure neighbourhood (resp. intuitionistic fuzzy structure open neighbourhood (or) intuitionistic fuzzy structure closed neighbourhood) of an intuitionistic fuzzy point $0_{r,s}$, then $x_{r,s} + A$ is an intuitionistic fuzzy structure neighbourhood (resp. intuitionistic fuzzy structure open neighbourhood (or) intuitionistic fuzzy structure closed neighbourhood) of an intuitionistic fuzzy point $x_{r,s}$. Moreover, any intuitionistic fuzzy structure neighbourhood of an intuitionistic fuzzy point $x_{r,s}$ is precisely of the form $x_{r,s} + A$, where A is an intuitionistic fuzzy structure neighbourhood of an intuitionistic fuzzy point $0_{r,s}$.

(iv) If A is an intuitionistic fuzzy structure q -neighbourhood (resp. intuitionistic fuzzy structure open q -neighbourhood (or) intuitionistic fuzzy structure closed q -neighbourhood) of an intuitionistic fuzzy point $0_{r,s}$, then $x_{r,s} + A$ is an intuitionistic fuzzy structure q -neighbourhood (resp. intuitionistic fuzzy structure open q -neighbourhood (or) intuitionistic fuzzy structure closed q -neighbourhood) of an intuitionistic fuzzy point $x_{r,s}$. Moreover, any intuitionistic fuzzy structure q -neighbourhood of an intuitionistic fuzzy point $x_{r,s}$ is precisely of the form $x_{r,s} + A$, where A is an intuitionistic fuzzy structure q -neighbourhood of an intuitionistic fuzzy point $0_{r,s}$.

Definition 3.8 Let (X, S) be any intuitionistic fuzzy structure space. Let $\mathcal{B}$ be any collection of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $x_{r,s}$. Then $\mathcal{B}$ is said to be a fundamental system of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $x_{r,s}$ if and only if for any intuitionistic fuzzy structure neighbourhood A of an intuitionistic fuzzy point $x_{r,s}$, there exists $B \in \mathcal{B}$ such that $x_{r,s} \in B \subseteq A$.

Remark 3.3 Let (R, S) be any intuitionistic fuzzy structure space. If $\mathcal{B}$ is a fundamental system of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $0_{r,s}$, then

$\mathcal{D} = \{A \cap (-A) \mid A \in \mathcal{B}\}$ is also a fundamental system of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $0_{r,s}$.

Corollary 3.1 Let (R, S) be any intuitionistic fuzzy structure space. Then fundamental system $\mathcal{D}$ of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $0_{r,s}$ consists of an intuitionistic fuzzy symmetric sets in the sense that $A \cap (-A) = -(A \cap (-A))$. Also, if $A, B \in \mathcal{D}$, then $A \cap B \in \mathcal{B}$.

Remark 3.4 Let (R, S) be any intuitionistic fuzzy structure ring. Then for each intuitionistic fuzzy structure neighbourhood A of an intuitionistic fuzzy point $0_{r,s}$ and for all $x, y \in R$, $((x_{r,s}y_{r,s}) + x_{r,s}A) + A \cdot A = x_{r,s}y_{r,s} + (Ay_{r,s} + (x_{r,s}A + A \cdot A))$.

Definition 3.9 A collection $\mathcal{P}$ of an intuitionistic fuzzy sets in an intuitionistic fuzzy structure space (X, S) is said to be an intuitionistic fuzzy structure prefilterbase on X if it satisfies the following conditions: (i) $0_{r,s} \notin \mathcal{P}$ and (ii) for every $A, B \in \mathcal{P}$, there exists an intuitionistic fuzzy set $C \in \mathcal{P}$ such that $C \subseteq A \cap B$.

Proposition 3.3 Let (R, S) be any intuitionistic fuzzy structure space. If (R, S) is an intuitionistic fuzzy structure ring, then there exists a fundamental system $\mathcal{B}$ of an intuitionistic fuzzy structure neighbourhoods of an intuitionistic fuzzy point $0_{r,s}$ such that the following conditions hold:

- (i) Each member of $\mathcal{B}$ is an intuitionistic fuzzy symmetric set,
- (ii) For all $A \in \mathcal{B}$, there exists $B \in \mathcal{B}$ such that $B + B \subseteq A$,
- (iii) For all $A \in \mathcal{B}$, there exists $B \in \mathcal{B}$ such that $B \cdot B \subseteq A$,
- (iv) For all $a \in R$, and for all $A \in \mathcal{B}$, there exists $B \in \mathcal{B}$ such that $a_{r,s}B \subseteq A$ and $Ba_{r,s} \subseteq A$.

Conversely, given a ring R and an intuitionistic fuzzy structure prefilterbase $\mathcal{B}$ at an intuitionistic fuzzy point $0_{r,s}$ satisfying conditions (i)-(iv), there exists a unique intuitionistic fuzzy structure S on R such that (R, S) forms an intuitionistic fuzzy structure ring such that $\mathcal{B}$ forms a fundamental system of an intuitionistic fuzzy neighbourhoods of an intuitionistic fuzzy point $0_{r,s}$.

VIEW ON INTUITIONISTIC FUZZY STRUCTURE RING VALUED STRUCTURE CONTINUOUS FUNCTIONS

Proposition 4.1 Let (X, S_X) be any intuitionistic fuzzy structure space and (R, S_R) be any intuitionistic fuzzy structure ring. If $\text{IFSC}(X, R)$ is the collections of all intuitionistic fuzzy structure continuous functions from (X, S_X) to (R, S_R) , then for every $f, g \in \text{IFSC}(X, R)$, $f + g, fg, -f \in \text{IFSC}(X, R)$.

Definition 4.1 Let X be a nonempty set. We define an intuitionistic fuzzy set $\alpha^* = \langle x, \mu_{\alpha^*}, \gamma_{\alpha^*} \rangle$ on X where $\mu_{\alpha^*}(x) = \alpha$ and $\gamma_{\alpha^*}(x) = 1 - \alpha$, for all $x \in X$. An intuitionistic fuzzy structure space (X, S) is said to be an intuitionistic fuzzy structure fully stratified space if $\alpha^* \in S$, for $\alpha \in [0, 1]$.

Remark 4.1 Let (X, S_X) be any intuitionistic fuzzy structure space and (R, S_R) be any intuitionistic fuzzy structure ring with additive identity 0 and multiplicative identity 1 . Then for every $x \in X$,

(i) $0^* : (X, S_X) \rightarrow (R, S_R)$ given by $0^*(x) = 0$ is an intuitionistic fuzzy structure continuous function.

(ii) $1^* : (X, S_X) \rightarrow (R, S_R)$ given by $1^*(x) = 1$ is an intuitionistic fuzzy structure continuous function.

Remark 4.2 Let (X, S_X) be any intuitionistic fuzzy structure space and (R, S_R) be any intuitionistic fuzzy structure ring. If (X, S_X) is an intuitionistic fuzzy structure fully stratified space, then $\text{IFSC}(X, R)$ forms a ring with respect to the usual addition and multiplication of functions.

Remark 4.3 Let $\text{IFSC}(X, R)$ be the ring of all intuitionistic fuzzy structure continuous functions from intuitionistic fuzzy structure fully stratified space (X, S_X) to an intuitionistic fuzzy structure ring (R, S_R) . Then

(i) $\text{IFSC}(X, R)$ is commutative, if R is commutative.

(ii) $\text{IFSC}(X, R)$ contains identity if R contains identity.

Definition 4.2 Let $\text{IFSC}(X, Y)$ be the ring of all intuitionistic fuzzy structure continuous functions from intuitionistic fuzzy structure space (X, S_X) to an intuitionistic fuzzy structure space (Y, S_Y) . Let A be any intuitionistic fuzzy structure open set in Y and $x_{r,s}$ be an intuitionistic fuzzy point in X . A collection $[x_{r,s}, A] = \{f \in \text{IFSC}(X, Y) \mid f(x_{r,s}) \subseteq A\}$ is a subset of $\text{IFSC}(X, Y)$. The collection of all such $[x_{r,s}, A]$ forms an intuitionistic fuzzy substructure, for some intuitionistic fuzzy structure on $\text{IFSC}(X, Y)$ is said to be an intuitionistic fuzzy point open structure and it is denoted by S_{IFPO} .

Definition 4.3 Let $\text{IFSC}(X, Y)$ be the ring of all intuitionistic fuzzy structure continuous functions from intuitionistic fuzzy structure space (X, S_X) to an intuitionistic fuzzy structure space (Y, S_Y) . An intuitionistic fuzzy set on $\text{IFSC}(X, Y)$ given by $x_A = \langle f, \mu_{x_A}, \gamma_{x_A} \rangle$ where $\mu_{x_A}(f) = \mu_A(f(x))$ and $\gamma_{x_A}(f) = \gamma_A(f(x))$, for every $f \in \text{IFSC}(X, Y)$. The intuitionistic fuzzy point open structure* (in short, S_{IFPO}^*) on $\text{IFSC}(X, Y)$ is generated by the intuitionistic fuzzy sets of the form x_A where $x \in X$ and A is an intuitionistic fuzzy structure open set in Y .

Definition 4.4 Let (X, S) be any intuitionistic fuzzy structure space. Let $\mathcal{A} = \{A_i \mid i \in J\}$ be the collection of an intuitionistic fuzzy structure open set in X . Then

I. $\mathcal{A}$ is said to be an intuitionistic fuzzy structure open cover if $\bigcup_{i \in J} \{A_i\} = 1_{\sim}$.

II. an intuitionistic fuzzy set A is said to be an intuitionistic fuzzy structure compact set if for every intuitionistic fuzzy structure open cover $\{A_i \mid i \in J\}$ such that $A \subseteq \bigcup_{i \in J} \{A_i\}$, there exists a finite subfamily $\{A_i \mid i = 1, 2, \dots, n\}$ such that $A \subseteq \bigcup_{i=1}^n \{A_i\}$.

Definition 4.5 Let $\text{IFSC}(X, Y)$ be the ring of intuitionistic fuzzy structure continuous functions from intuitionistic fuzzy structure space (X, S_X) to an intuitionistic fuzzy structure space (Y, S_Y) . Let K be any intuitionistic fuzzy structure compact set in X and A be any intuitionistic fuzzy structure open set in Y . An intuitionistic fuzzy set on $\text{IFSC}(X, Y)$ given by $K_A = \langle f, \mu_{K_A}, \gamma_{K_A} \rangle$ where $\mu_{K_A}(f) = \inf_{x \in \text{supp}K} \mu_A(f(x))$ and $\gamma_{K_A}(f) = \sup_{x \in \text{supp}K} \gamma_A(f(x))$, for every

$f \in \text{IFSC}(X, Y)$. The intuitionistic fuzzy compact open structure (in short, S_{IFCO}) on $\text{IFSC}(X, Y)$ is generated by the intuitionistic fuzzy sets of the form K_A .

Proposition 4.2 Let (X, S_X) be any intuitionistic fuzzy fully stratified structure space and (R, S_R) be any intuitionistic fuzzy structure ring. Then

- (i) $(\text{IFSC}(X, R), S_{\text{IFPO}})$ is an intuitionistic fuzzy structure ring.
- (ii) $(\text{IFSC}(X, R), S_{\text{IFPO}}^*)$ is an intuitionistic fuzzy structure ring.
- (iii) $(\text{IFSC}(X, R), S_{\text{IFCO}})$ is an intuitionistic fuzzy structure ring.

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